GrummanWorld

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Updated ATS Adds New Dimension To Flight Testing

CALVERTON, L.I. — Grumman's upgraded Automated Telemetry Station (ATS) recently proved its ability to look inside an airborne plane. The ATS is now being used for avionics as well as airframe and power plant flight performance testing.

The ATS passed its first test on November 23, 1987. For the first time the station's new computers were coupled with three new precision radars located about a mile away on the grounds of the Calverton Flight Test Center. They allowed Flight Test engineers to track the maiden flight of the first F-14D avionics development aircraft. More importantly, the engineers could verify the accuracy of the airborne plane's on-board navigation system.

"With a plane in the air we can determine in real time the accuracy of its navigation system. It was the first time we put it all together and it all worked quite well," says Tom Kastner, the director of the ATS. "The ability of the ATS to merge real-time aircraft system data with remarkably accurate radar data is an industry first."

While most of the major ATS upgrades are done, there are a few still to come. The final work won't be finished until this summer.

But the new system is already getting a good workout. By the end of 1987 there were about twice as many test flights as there were in the beginning of the year.

The pace will increase in 1988. The OV-1D Mohawk program will be using the ATS this summer to flight test new avionics being installed in that aircraft. Flight Test is flying only one F-14D avionics development aircraft now. "In March we pick up the second airplane and in June the third," says Bob McShea, team leader of the F-14D avionics flight test program. "After that, each plane will be flying about two flights per week."

The scope of current avionics testing is limited because the first F-14D development aircraft carries only the basic computer software — navigation and communications. The computer programs for the displays, flight controls and weapon systems are being loaded and tested in stages, called groups. The current program is Group 2. Group 6 will be the final F-14D software.

The ATS was built in the early '70s for the F-14A vehicle development program to keep tabs on the condition of a test aircraft, its power plants and its performance during test flights.

When the Navy decided to put advanced weapon, navigation, communication, radar and instrumentation systems into the F-14D and the A-6F, an upgrade to the ATS was needed. Over the last three years, Data Systems and flight test engineers have been modernizing and upgrading the ATS, as well as adding the new tracking and telemetry systems.

Flight test engineers now have new computer monitors that display information calculated

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To The Heart Of The Matter. *Flight test engineer Mary Anna Brush uses an Automated Telemetry Station program called Validate to keep track of a plane's performance during a test flight. With it, she can see how well the plane's avionics are functioning, get tracking system, missile or target information, or even check the performance of electrical, hydraulic or other aircraft systems. (Photo by Gerry Costello)*

They Were Made For Each Other. *Within 24 hours of the arrival of the 57-foot V-22 Osprey fuselage, the wing was attached by workers at Bell Helicopter Textron's flight research center in Arlington, Texas. The fuselage was assembled by Boeing Vertol in Philadephia, Pa. Under a Grumman Aerostructures subcontract, Milledgeville Operations produced the composite parts and Stuart Operations built the empennage — the rear part of the fuselage including the vertical and horizontal stabilizers. Rollout of the first V-22 is planned for this summer at Arlington.*

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Educators Get Schooled On CIM Technology

Educators from 10 school districts on Long Island were introduced to computer integrated manufacturing (CIM) at a recent Technology Day at Grumman.

"We want schools to be in touch with manufacturing's changing technology," says Phil Bevelacqua, CIM project engineer. "Our goal is to expose young people to as much information as we can so they can begin thinking about their future."

The 20 educators began the day viewing a videotape on CIM technology, which included an overview of a Grumman-developed computer voice input system. A digitized voice asks questions of a quality control inspector, who enters this information by replying to the computer instead of filling out a form.

"These new technologies are opening up new career paths for people," says Bevelacqua. "Manufacturing people will now be required to have some computer knowledge. That's quite a change from the past. How will the students be prepared for these changes if the schools are not aware of them?"

Grumman also hosts Technology Days for Science and Business. Twenty other companies on Long Island are sponsoring such days as part of an effort to promote more interaction between education and industry.

After a tour through Buildings 3 and 9, the group exchanged ideas about educational requirements and the need for people with a broad background of knowledge entering the work force.■

Touring New Technology. *Phil Bevelacqua, project engineer for CIM, hosted a tour through Buildings 3 and 9 during a recent Grumman Technology Day.*

New Use. *The upgraded Automated Telemetry Station gives systems engineers a real-time look into an airborne plane's avionics — an industry first. It also gives engineers, such as test conductor Neil Jantzen and propulsion engineer Karen Kanarek, better real-time data on the plane's engine, hydraulics and other such systems. (Photo by Gerry Costello)*

New Dimension To Flight Testing

(Continued from Page 1)

from raw data sent down from the test plane. The system can process more information than ever before. It can also monitor the testing of several planes — under both classified and unclassified conditions — simultaneously.

"On the old system we had only one monochrome scope and a bunch of strip chart recorders, says Kastner.

The strip chart recorder produced graphs showing streams of data from the plane. The data had to be analyzed after the flight.

"With the old system, if we had a flight today, I might be able to give you the results of some calculations in two weeks," McShea says. "Now, I can give you the answer to that calculation in two minutes. We have information that lags the event by eight to 12 seconds, and we're working toward two seconds."

While the strip chart recorders are still being used, they now calculate information. Meanwhile, the computers are taking the raw data and putting, almost instantaneously, vital information about the plane, its mission computers and electronics, on the color monitors for the engineers to analyze during the flight.

This real time analysis, as it's called, permits problems to be spotted and, perhaps, fixed during a test flight. Once the flight ends, the real time information makes post flight debriefs more valuable. Repairs or improvements to the plane can be made within hours instead of days. In addition, the new system can plot a plane's exact position within feet. It can do this with the new radars and a black box called Minimap.

"Every aircraft in the world that has instrumentation has TACAN (tactical air navigation system), which picks up range and bearing information from FAA-run stations," McShea explains. "Minimap is a Grumman-developed-and-patented box on the airplane that polls 10 TACAN stations. With it we can determine the location of the plane to within 50 feet."

Grumman-developed software systems called RadarBet and Situate can take position data on up to eight airborne aircraft. They then calculate the path they'll take and plot the location of each on a mission display.

"We have other software that calculates comparisons between all those tracks so any coordinate calculation you want can be done," says McShea.

In some cases, ground testing can also be substituted for flight tests. "We can receive telemetry from the anechoic chamber. This is something new," says Kastner. "We can simulate a flight in the chamber and do analyses using all the programs we would normally use in actual flight."■

Time To Sign Up For Shareholders Meeting

The annual meeting of Grumman shareholders is scheduled for 2 p.m. on Thursday, April 21, in Building 4. Earlier this month, Bankers Trust Company, agent for the trustees of the Grumman Employee Investment Plan, began mailing plan members proxy statements and confidential cards for voting at the annual meeting. .

Employees are asked to return the completed cards by April 1 to Bankers Trust in the self-addressed, postage-paid envelopes that accompany the proxy statements.

Because Grumman shares obtained through the Investment Plan are held in trust for each individual member, being a plan member does not automatically entitle participants to attend the annual meeting. Only those persons owning shares of record — that is, shares purchased outside the Investment Plan prior to the record date of March 2, 1988 — are eligible to attend.

Grummanites who own company shares as of the record date and who wish to attend the meeting should present their proxy card at any Employee Services office before April 1 in order to pre-register. Your proxy card should then be mailed immediately in the return envelope provided.

Obituaries

Peter Cirko of Quality Control, Glen Arm, Aircraft Systems Division, died Feb. 26 at the age of 62. He had been with the company since 1967 and resided at 7 S. Kelly Ave., Bel Air, Maryland.

George R. Koelsch of F-14 Modification, Calverton, Aircraft Systems Division, died Feb. 29 at the age of 58. He had been with the company since 1970 and resided at 99 Lake Promenade, Lake Ronkonkoma, N.Y.

Gregory P. Nadolny of Budgets, Planning and Controls, Bethpage, Corporate Services Division, died Feb. 16 at the age of 28. He had been with the company since 1986 and resided at 13 Roosevelt Ave., Massapequa Park, N.Y.

Only The Best. *Stuart's Charlie Beagan (C), 767 lead inspector, and Lou Blum (R), 767 production supervisor, accept the Boeing Pride In Excellence award from Don Jimmestadt, Boeing superintendent, Quality Assurance. (Photo by Jim Ferris)*

Stuart Is Building A Dynasty; Wins Fourth Boeing Award

Boeing Commercial Airplane Company awarded the Grummanites at Stuart Operations, Florida, its prestigious Pride In Excellence award for the fourth year in a row.

To earn it, they had to meet tough performance requirements on the Boeing 767 wing center sections they build under an Aerostructures Division subcontract.

"I'm proud of the entire work force," says Bob Watkins, vice president and general manager of Stuart Operations. "Winning the award again was a particularly significant accomplishment in 1987. The production rate increased significantly last year, while new configuration assemblies were also being added to the production line.

"The 767 program team is made up of experienced and new people. This award is a tribute to their ability to work together," Watkins adds.

They delivered 44 767 wing center sections in 1987 as opposed to 30 in 1986. Their delivery rate went from three a month in 1986 to five a month at year's end last year.

"Winning this award is a difficult challenge for a contractor," says Pete Ekrem, Boeing's senior manager, Surveillance for Major Structures. "Each year the quality target gets tighter and tighter. To earn four consecutive awards as Grumman has is quite an achievement."

Boeing rates each of its major contractors not only on quality of the delivered product, but also on how well cost and scheduling requirements are met. Of the hundreds of Boeing contractors, only five in the United States received the Pride In Excellence award.

Grumman Systems Support Now Linked Nationwide

Grumman Systems Support field engineers repair the latest computers and related hardware. Now they have a business tool that makes their electronics skills more competitive.

Systems Support, a unit of the Data Systems Division, built a single, networked computer system in its Woodbury headquarters to manage its nationwide computer hardware service business.

"This was extremely important to us to coordinate our national operations," says Bill Waas, vice president, Planning Resources. In addition to parts inventory, financial and work load reporting, Waas says, "the system can also create statistical information that we can use for pricing our services better. Those statistics weren't available before."

Information such as how much time to bill to a job or the time between failure of customers' hardware is more accurate on the new system. Access is direct. Information once available only on paper can be brought up on a screen in seconds in any of the 45 GSS offices across the country. All that's needed is a personal computer or a dedicated terminal and connection to a phone line.

"The field techs can dial in and get parts inventory or check other assignments," says Jim Kinneman, manager of Support Services Planning.

Little had to be invested in new equipment. "About the only thing we purchased was a financial software package and some minor equipment," Kinneman says.

The new system is about 70 percent complete. Grummanites in the field offices are now feeding back ideas for modifications and enhancements to the system designers. The next step will be to eliminate modems in regional offices and install dedicated telephone lines.

"In the future," says Kinneman, "engineers could use remote, hand-held terminals to enter data from the customer's site or check on parts inventory."■

Personal Access. *System Support's computerized network, with its parts inventory, financial and work load information, will eventually be accessible from personal computers, such as the one used here in GSS's Woodbury headquarters by administrative assistant Debbie Niebuhr. (Photo by Bob Settles)*

Unit Values

The Grumman Employee Investment Plan's unit values as of January 31, compared to the figures for December 31, 1987, are:

Equity Fund
3.929 up from 3.754

Fixed Income Fund
6.095 up from 5.888

Guaranteed Income Fund
2.695 up from 2.672

Company Stock Fund
$18.69 up from $17.31

The company matching contribution for the Employee Investment Plan will be 50 percent for the second quarter of 1988.

Bruns To Head Emergency Products

Bill Bruns has been named president of Grumman Emergency Products, effective April 1.

Bruns replaces Wells Darling, who is retiring. Bruns joined Grumman in 1966 as a manpower planner in Bethpage. He held a variety of assignments in business operations, including two years on the F-14 program in Iran. Bruns transferred to Allied's Emergency Products unit in 1982. In 1985, he was named vice president of marketing, and earlier this year, senior vice president.

Loar, Former Allied Chairman, Dies

Bob Loar, former chairman of the board of Grumman Allied, died Sunday, March 13, at the age of 76.

Loar began his career at Grumman in 1942. When Grumman Allied Industries was formed in 1962 as a Grumman subsidiary, he was appointed vice president of the new company. In 1963 he was elected a director of Allied; two years later he was named senior vice president.

In 1972 Loar became chairman of the board and CEO of Grumman Allied. He was later elected a director of Grumman Corporation. He retired in 1977. During his retirement he served as a consultant and a trustee of the Grumman Pension Fund until December 1986.

Loar is survived by his wife, Viola, of 132 S.W. Peckham Street, Port Charlotte, Florida 33950. The family requests that donations be made to the Sisters of Charity, Halifax, Nova Scotia.■

Avionics Lab Helps 'Fly' Software For Next Tomcat

At Calverton, Long Island, an F-14 Tomcat is now flight testing parts of the software that will be aboard the next-generation F-14D.

An hour's drive west, in Bethpage, the F-14D avionics development lab helps solve system software and hardware problems uncovered in flight. Software is the logical and mathematical code that tells the aircraft's complex electronics what to do and how to work in harmony.

Eventually, four developmental aircraft will be used to support system flight tests, each concentrating on different software features of the developing program. The software is being developed in six versions; the F-14 at Calverton is now flight testing the first.

"The development project is a careful, rational buildup where capabilities are being added gradually to the prototype aircraft," says Joe Van de Wetering, F-14D director of engineering. "The lab is now wrapping up its development work on the first version of software containing the plane's navigation, stability and control and simple communications functions."

In all, the F-14D will have 28 major electronic subsystems, some of which are still on subcontractors' drawing boards. Other systems are government-furnished, as opposed to custom designed for the F-14D.

Thanks to the lab, a plane does not have to be grounded to solve any problems that require investigation. In addition to extensive test programs and simulation equipment, there are twin systems integration test stations: F-14 forward sections stuffed with the plane's avionic hardware. While the first station tests code for one software package, the other station works on the next.

"The second version of software will contain the initial radar and stores management capabilities," says Van de Wetering.

To illustrate how the laboratory has helped in problem solving, the flight test program uncovered a glitch in the backup navigation system's software. This system goes on if the aircraft's main inertial navigation system fails.

"A computational timing problem caused the backup system to 'think' the main system had failed, when it hadn't," says Jim Eng, a group leader for F-14D Systems Integration. "Chances are, in flight, the discrepancy wouldn't have occurred again. But the lab allowed us to repeat it, identify the source, and solve it quickly."

A more common example was when the radar altimeter on the heads-up display appeared too soon (it is supposed to come on at 25,000 feet). Solving this problem involved a minor change to the software.

The weightiest assignment for the lab will be debugging the third version of software and supporting the associated flight tests. This version will contain the balance of the radar and stores management software.

This is in preparation for live weapons firing at Point Mugu in mid- to late 1989, the final quarter of the development program. The third software increment will also have some electronic warfare and weapons management capabilities.

"This software must be completed by December 1," says John George, a staff assistant. "We expect this version to be the most difficult because it will include a lot of the remaining intercept-and-attack software. This includes programs that plan strategies and interact heavily with the rest of the systems on the plane."

A major part of the avionics development effort is the integration of seller and government-furnished subsystems into the F-14D. The single most important element is the Hughes-designed radar, which will also undergo its own incremental software development program. That effort has been scheduled to coincide with overall F-14D software development.

Like the flight test teams in Calverton, the engineers in the development lab are working closely with Navy teams. "We have pilots and radar intercept officers here all the time," says Eng. "They all have suggested ways to make the systems more functional and easier to understand, especially the displays in the cockpit."

The systems integration test stations also are used to devise flight test plans. People from flight test and the F-14D program bring in flight test cards, "fly" a test station, and adjust their flight itinerary according to the results.

"The F-14D program is an intense software project, but the payoff will come when the aircraft joins the fleet," says Van de Wetering. "From then on, upgrading the aircraft will be very simple. The Navy will just change the software."■

Systems Improvement. *In the F-14D Avionics Development Lab, Joanne Calamia and John Spiletic debug one of the on-board displays. The extensive software for this next-generation Tomcat is being developed in six phases. (Photo by Rich Breunig)*

Frame By Frame. *In the F-14D Avionics Development Lab, Bill Piccolino tests software using the systems integration test station in background. The lab has two of these stands to permit gradual development and testing of software. (Photo by Rich Breunig)*

Tokamak Comes Closer To Achieving Limitless Energy

Grumman is now on a team bidding on Princeton laboratory's next experimental fusion reactor

PRINCETON, N.J. — They've recorded some pretty hot temperatures here recently — hotter, in fact, than the surface of the sun.

The setting is the Tokamak Fusion Test Reactor (TFTR), which occupies a room the size of two gymnasiums here at the Princeton Plasma Physics Lab. Not too long ago, the fuel inside the reactor achieved its hottest operating temperature ever: 300 million degrees Celsius. From 1976 to 1983, Grumman was teamed with Ebasco Services, a major nuclear engineering corporation, to design and build this huge test reactor.

"Grumman is now a subcontractor to General Atomic Technologies on a bid to design two major parts of the follow-on Compact Ignition Tokamak (CIT)," says Dr. Alan Todd, a Corporate Research Center senior staff scientist and Princeton office manager for Grumman. "We are subcontractors on the CIT's vacuum vessel and an articulated boom manipulator. Like systems on the Space Shuttle and Space Station, the manipulator would be remotely controlled and would do dangerous tasks."

In addition to providing a perpetual energy resource, the material used is cheap.

CIT is expected to go into operation in the early to mid-1990s. It will be built adjacent to the current Tokamak and is expected to cost about $350 million. Grumman also has an independent bid on a systems engineering contract for the entire CIT project.

"Systems engineering will be critical on the CIT project," says Todd. "Parts of the new reactor will be designed and built by companies and national laboratories scattered around the country. In addition, we expect the lab to issue a contract for technical support. The lab would start out with about 40 people, but that could go into the hundreds. They would support the whole range of the lab's projects."

The Plasma Physics Lab is on Princeton's Forrestal Campus, five miles north of the town and the main university campus. At its peak, about 200 Grummanites were assigned to the program to build the TFTR. A crew of 14 remains, including five scientists and four engineers.

In a world of finite fossil fuels, fusion promises a limitless source of energy. It's the same process used by the sun and stars and one of two ways to transform mass into energy.

In fusion, the nuclei or centers of two light atoms are fused, creating a heavier nucleus

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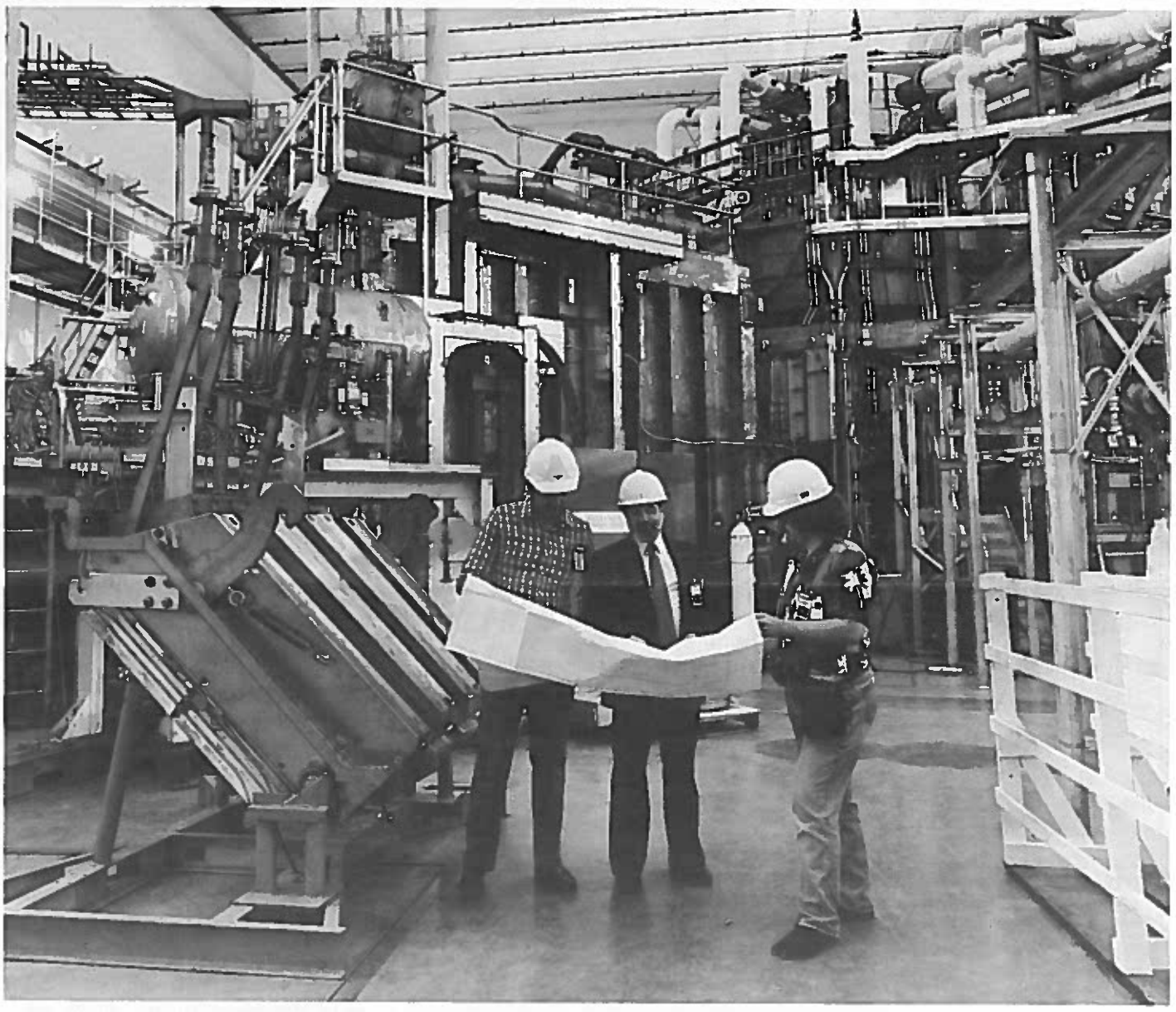

Giant Testbed. *At the Princeton Plasma Physics Lab, Grummanites George Barnes, Stan Mendelsohn, and Jim Mueller review a blueprint. The huge system was shut down temporarily for alterations that will permit additional measurements during tests. (Photo by Bob Settles)*

A Chain Reaction

The word "Tokamak" is Russian and describes the internal magnetic configuration of one type of nuclear fusion device. The shape is key to the way it works.

A tokamak is shaped like a doughnut. It contains a vacuum with a pressure of about 1/100 billionth of the atmosphere. The vacuum is surrounded by two sets of coils: *toroidal* and *poloidal*. The toroidal coils are like rings around the doughnut; the poloidal ones follow its path and are ring-shaped. These create electromagnetic fields.

Also inside the device are deuterium and tritium gases. The mixture is called plasma because it is capable of carrying an electrical charge. In nuclear fusion there are many ways of heating the plasma.

In the TFTR, heating is accomplished in three ways: the electrical current; a magnetic field that compresses the plasma and causes the temperature to increase; and four neutral particle beam injectors. In this super-hot environment, the deuterium and tritium fuse, producing energetic helium-4, the common form of helium (also called an alpha particle), and a more highly energetic free neutron. The vessel's shape makes for an endless circuit.

The goals of fusion research are to maximize temperature; density, the number of atoms in a given volume of plasma; and confinement time, keeping that energy for as long as possible.

The required confinement time of the next generation Compact Ignition Tokamak will be .3 second, which has been achieved by the current Tokamak Fusion Test Reactor. However, CIT will confine a much higher density plasma at the same temperature.

Experiments only last two to three seconds with the TFTR. It must be shut down for five minutes to cool, then fired up again. The Compact Ignition Tokamak will call for 10-second experiments; after each, it will require one hour to cool.

"Those are enormous cycling periods," says Todd. "It is totally inefficient from a commercial viewpoint. A reactor would have to be running steadily.

"There are other ways to make fusion electricity," he continues. "The Tokamak is just one concept, but it's the one energy experts think will be the near-term solution."

Child Care Survey

Grumman is evaluating what impact day care has on its work force and needs your help in coming up with the facts and figures. If you have children — or plan to start a family in the future, please fill out this form and mail it to Judy Sanders, E02-GHQ.

☐ Married ☐ Male
☐ Single ☐ Female

Ages of dependent children: .....
☐ no children right now

Who watches your children while you work? *(Check all that apply)*
☐ spouse, because we prefer it that way
☐ spouse, because we cannot find adequate day care provider
☐ family members
☐ babysitter
☐ day care facility
☐ children are in school

If you have children in school, who watches them after school?
☐ spouse
☐ babysitter
☐ siblings/children are old enough to be alone
☐ day care facility
☐ school program

Will you have a need for day care services in the next five years?
☐ yes
☐ no

Would you prefer a day care provider that is:
☐ close to your home
☐ close to where you work
☐ close to family members

How many times have your day care arrangements changed in the last 12 months?
☐ none
☐ one
☐ two
☐ three or more

Are you pleased with the availability of day care providers in your area?
☐ yes
☐ no

Are you pleased with the services offered by the day care providers in your area?
☐ yes
☐ no

Where do you work?
☐ Bethpage ☐ Melville
☐ Great River ☐ Calverton
☐ Woodbury ☐ Holtsville
☐ Stuart ☐ St. Augustine
☐ Melbourne ☐ Milledgeville
☐ Sturgis ☐ Montgomery
☐ Other:.....

What town do you live in?
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What is your main concern regarding day care?
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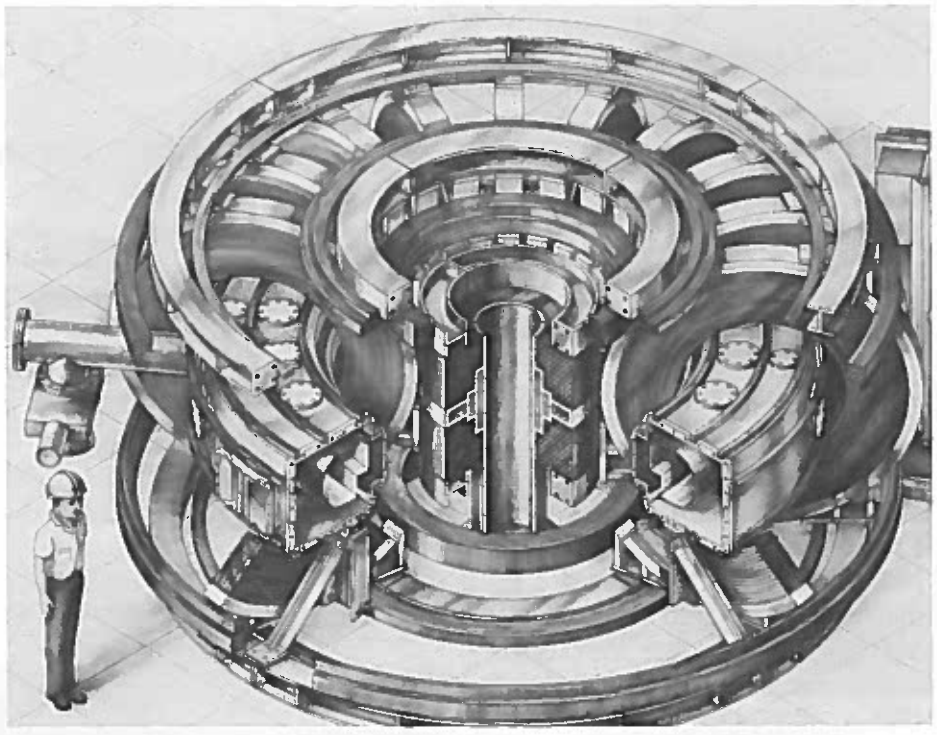
Mail to: Judy Sanders, E02-GHQ



Smaller Package. *Fusion reactors aren't always giant-sized. Grumman is bidding on a small reactor for Columbia University, shown in this drawing.*

Fusion Reactor Heats Up

(Continued from page 5)

and releasing some binding energy. Since nuclei carry positive charges and normally repel one another, they must be super-heated to collide and fuse. In nuclear fission, power is generated by splitting atoms of heavy elements, such as plutonium.

Fusion has been investigated since the early 1950s and is not expected to become commercially practical until 2020. "If it was converted to electricity, about five megawatts could be produced by the TFTR at its present status," says Todd. "That's like using a supercomputer for home accounting."

The TFTR is the largest nuclear fusion device in the U.S., and while smaller, the CIT will have far greater performance. The world's largest is in Western Europe; there are other big ones in Japan and the U.S.S.R. There are a host of small ones operated by national laboratories and universities; Grumman has proposed to build one for Columbia University.

The research is declassified and there is a lot of international cooperation. The 1987 Reykjavik Summit produced an agreement that the U.S., U.S.S.R., European nations, and Japan will cooperate in developing an International Tokamak Energy Reactor. If built sometime in the next century, this device would be located in Germany. Grumman has a contract with Lawrence Livermore laboratory for study of this reactor.

The TFTR is now about two-thirds the way toward its goal: engineering break-even, or power output equal to the power required to heat the plasma. Even at break-even, the test reactor will still require an outside source of heating — its four neutral particle beam injectors.

So, the next step is to build an entirely self-sustaining device. Physicists call this ignition — hence the name, Compact Ignition Tokamak. In lieu of neutral particle beams, the CIT will initially heat the plasma using FM band radio waves.

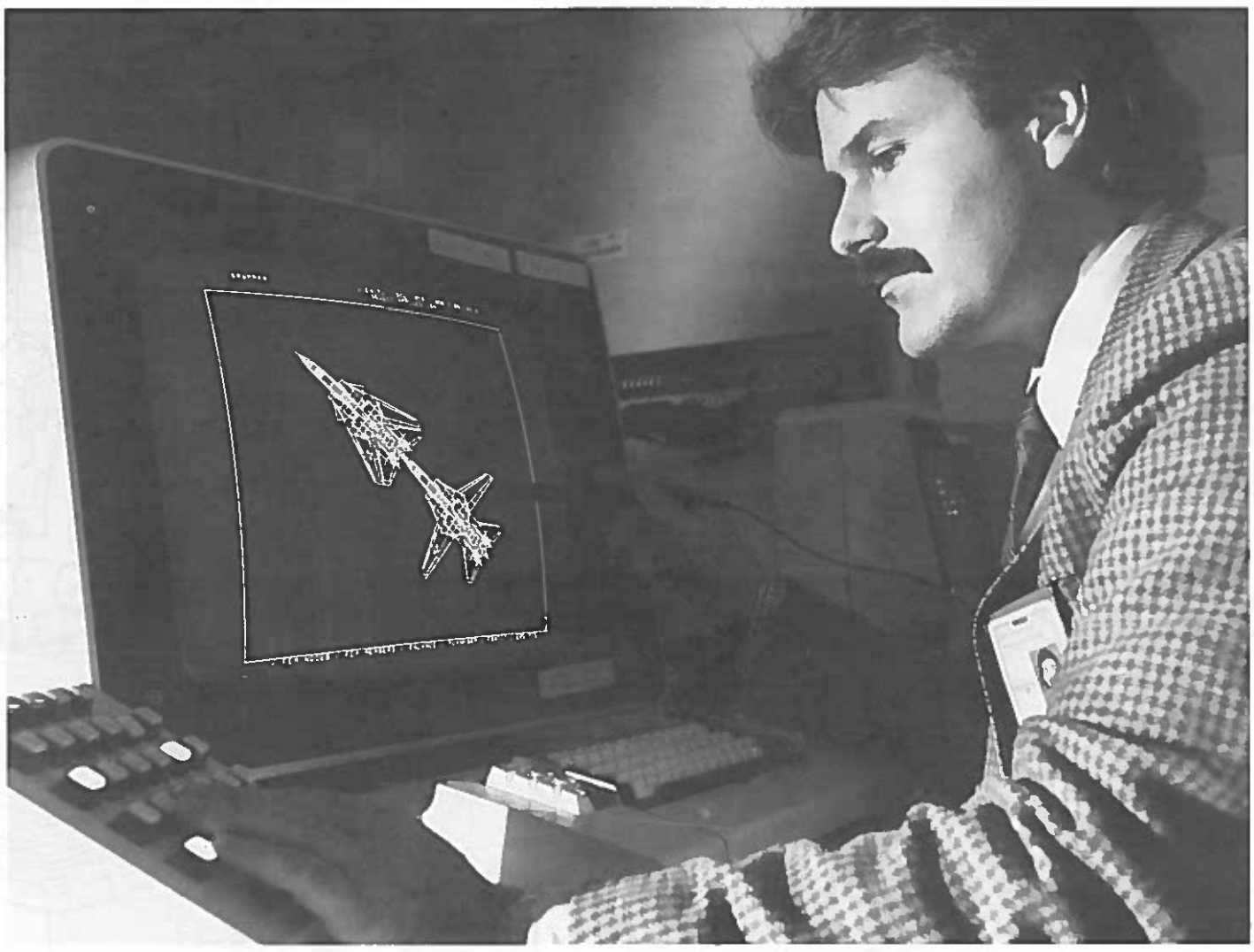
In addition to promising a perpetual energy resource, the material in today's experiments — deuterium — is cheap. Tritium is also needed for ignition experiments in reactors. Both are forms of hydrogen, and though tritium must be created in the reactor's processes, deuterium is among the world's most plentiful substances. It is found in seawater. This is in stark contrast to the expensive fuels that fire fission reactors.

No less important, the process is safer. Fusion can only be accomplished inside a vacuum. If anything goes wrong with a fusion device, the vacuum breaks and the device shuts down. There are no uncontrollable fires, no "meltdown" scenario.

Of the two substances, only tritium requires precautions for safe handling — and it is still far less dangerous than uranium or plutonium. There also is no radioactive waste fuel.

The current oil glut has stolen some of the thunder from energy research. But Todd is optimistic about fusion's long-term outlook.

"With oil plentiful now, there are guys who have stood up in Congress and said, 'There is no energy crisis,' " says Todd. "But there will be a need in the future for fusion energy. Grumman is in a strong position to compete for future work."■



Got The Picture. *Using the scanner in Building 3 is like making photocopies. Instead of having a paper reproduction, the scanner copies anything from formal engineering drawings to sketches drawn during a morning commute and recreates it as computerized manufacturing data. Here Jeff Lloyd manipulates an image on the Grumman Engineering and Manufacturing System.*

Watch Out For These Guys; They'll Copy Anything You Have

Filed away in Building 2 in Bethpage are 850,000 templates. Each is a pattern for older Grumman aircraft parts. When one of these parts is needed, a machinist has to use a template and hand cut and drill sheet metal until he's produced an exact copy. Wouldn't it be great if he could just photocopy the template?

In a sense, that's what the autodigitizing group in Aircraft Systems' Manufacturing Engineering department does. Using a huge scanner, the seven-member group can optically produce manufacturing data from an item and input the information into Grumman's engineering/manufacturing system called GEMS.

The group works in the basement of Building 3. It's worth the trip if you want something placed into the GEMS or any other Grumman electronic data base. Hand-drawn sketches, electrical circuit diagrams, templates, flat parts, pages of text, and engineering drawings can be scanned.

"We have a capability that could save the company a lot of money," says senior manufacturing engineer Larry Org, "However, not too many people know about us."

Over the past several years Grumman has extensively automated its detail parts production operation. The autodigitizing system was needed to help keep these new computer-driven machines working.

"It's a very productive system," Org says. When the system was first used in 1985, 6,000 templates were transformed into electronic manufacturing data at the rate of 700 a week. The system can scan as many as 20 templates in a single pass. "It's impossible to computerize parts information from hard data any faster, says Org.

His group has tackled all sorts of projects since 1985. "One man came to us with an aircraft carrier book. Its pages were yellow, like parchment," Org recalls. The old book had accurate floor plans of the different decks of a certain aircraft carrier. "We scanned the layout of the carrier's avionics shops and input them into GEMS so engineers could do shop layout designs for test equipment," Org says.

The Syscan autodigitizing system is used by many companies around the world — for map making. "We were the first American aerospace company to use this system, and we were the first company in the world to use it for templates for automated routers," says Org. "Engineering drawings are maps — they are all just data."

The scanner works like a telecopier used in offices to send documents over phone lines. It looks at the item and reproduces the locations of all edges, lines, and holes as computer code. The computer that drives the system measures all the holes and curves and corners. Its measurement technique is so good that it's accurate to tolerances of two ten-thousandths of an inch or better.

The scanner is remarkably sharp-eyed. It's so good that data from the scanned image cannot go directly to the GEMS system. When the drawing or part is scanned, the computer displays an image of the part on the monitor of a raster workstation. A raster image is a rough image: circles and curves, for instance, are shown as if made by short, straight lines.

Technicians called "raster editors" study the images closely, because the system picks up everything. "The scanner can acquire things we can't see, such as scratches and dust particles," says Org.

The editors rid the image of the useless and unwanted data. Then it goes back into the computer and vector images are created. These images are detailed and clean — perfect images of the original item.

The computer can now determine all the necessary dimensions from the image. This data is then passed to GEMS. From there it can be fed to parts-making machines, such as the aluminum profile cell in a separate building on the north side of Building 3.

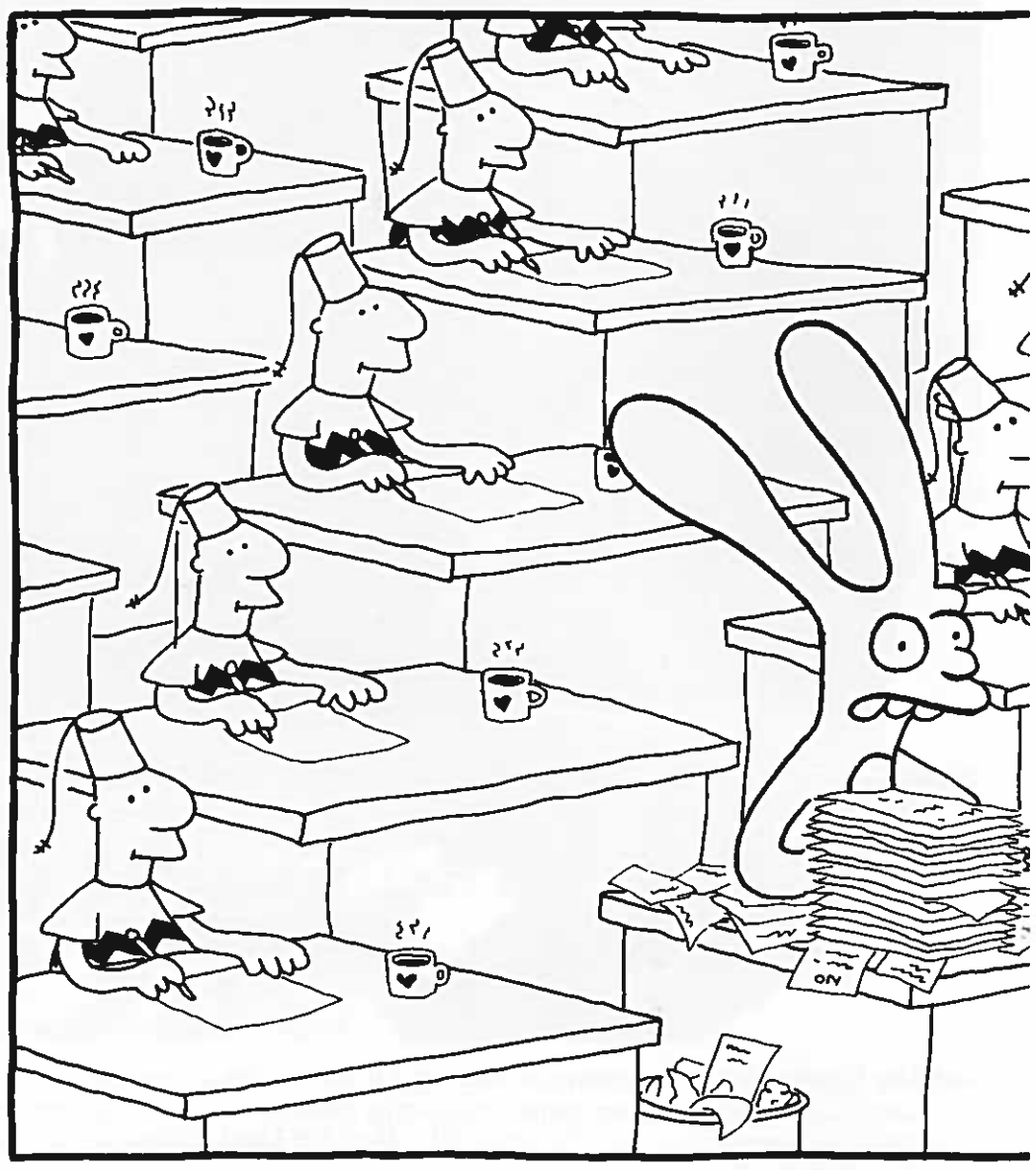
Soon, the system will have the capability to communicate with other Grumman sites via microwave satellite.

If you are interested in using the scanner, contact Org, (516) 575-4658.■

Screen Test. *After the drawings have been through the raster editing process, manufacturing engineer Ed Helm makes sure the drawings on the screen are accurate reproductions of the originals. (Photos by Bob Settles)*

Mad As Hell And Can't Take It Anymore?

Stress management is a common-sense way to get a grip on runaway anxieties



From Work Is Hell, *a cartoon book by Matt Groening. Copyright 1986, published by Pa*

Your desk is piled high with papers, yet you never seem to catch up. Driving home from work, you keep screeching your tires and screaming at the other motorists. You're moody and snappish with friends and family. Each night, you toss and turn in bed until 3 a.m.

You're under stress. You're not alone. The '80s have been an economic roller coaster ride and an era of international tension. In the workplace, the decade's role model is the ruthlessly brilliant man or woman who works 70-hour weeks.

Everybody experiences stress, albeit in different ways. Among its physical signs are fatigue, headaches, upset stomach, insomnia, backaches, high blood pressure, and muscle tension. Psychological signs include irritability, hostility, withdrawal, feelings of helplessness, and inability to concentrate.

"Stress is a biochemical reaction to events in our lives," says Mary Ruppert, a counselor who teaches a half-day workshop in stress management as part of Corporate Training's management development course. "You can't get rid of stress; it's a normal fact of life. Our lives would be very dull without it. But people can learn to become more stress resistant, before it makes them sick.

"In America, we have a very high incidence of stress-related disease — ulcers, high blood pressure, heart attacks," says Ruppert. "Most physicians now recognize that many illnesses can be traced directly to poor control of stress." For instance, research has shown that children treated for allergies often are tense overachievers. Some types of cancer have even been linked to stress.

Getting a grip on stress can make you more productive and creative, as well as healthier. There actually are two kinds of stress: distress and eustress. The latter is the normal kind of stress associated with life events such as marriage or changing jobs. In the office, some eustress is desirable — it motivates people. The key is not to let it become distress.

Every person has a level at which pressures become a burden. Pop psychologists divide people into anxiety-ridden "type A's" and unflappable "type B's." In reality, there are degrees. Disposition, partly an inborn trait, plays a role as does your upbringing. You learned by watching your parents handle stress, and if you were overprotected, you have had little practice.

Stress is contagious. You are affected by the stressful behavior of those around you: your loved ones, your co-workers, and, very important, your boss. Psychologists call it the "bunker syndrome." John Brody, manager of health services for the Medical Department, has seen evidence of the bunker syndrome at Grumman.

"In the old Grumman corporate culture, change was slow," says Brody. "In the last few years, the defense market and the company have changed dramatically. Production contracts are no longer guaranteed after a design contract. We also have to respond quickly to a changing market and deal with many competitors."

"People got used to Grumman being such a friendly, easygoing place to work. But they are now under pressure to adapt to the changing corporate culture and business environment," says Brody. "If the work environment is stressful, it is bound to affect you."

One of the bad things about stress is, it is tenacious. The physical and psychological problems associated with stress are self-perpetuating. In desperation, some people turn to alcohol and drugs — particularly prescription drugs such as Valium — which only make things worse.

Experts say people with stress problems should begin following the usual maxims of healthy living. Eat a low-fat, low-sodium diet, and get ample exercise. Try to get enough sleep — and during bouts of insomnia, don't let that become stressful. Get up and read a book. Avoid caffeine, alcohol and tobacco.

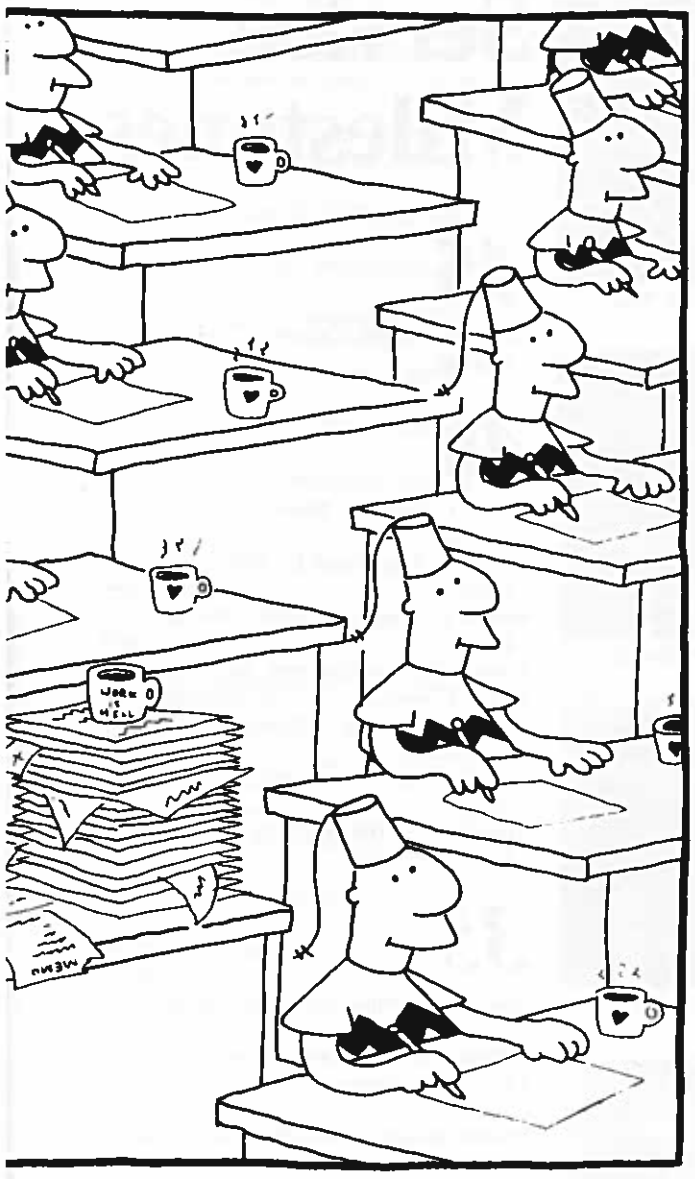
Much of what is covered by a stress management course is common sense. You may also find reading a few pertinent books helpful. The first step is recognizing what you can change — and what is beyond your control.

"A traffic jam can drive you crazy if you let it," says Brody. "But if you live in a heavily populated area like Long Island, you can't do anything about it. So, do something with that time — for instance, listen to a book recorded on cassette tape."

Stress management also involves learning to relax — not as easy as it seems for the tense individual. Deep breathing is a good way to counter on-the-job stress. If you're on a break, close your eyes for several minutes and imagine a calm, serene place. Get up and stretch once an hour while working on a video display terminal.

After work, you should make time every day for some activity you enjoy. It's doubly beneficial if it involves exercise. And if you haven't gone away on vacation for two years, do it soon. Contrary to popular belief, overwork makes you less productive.

Time management is one of the most important parts of coping with stress. You must learn to assign priorities, both at work and outside it. Determine what items matter



Books. Reprinted with permission from the author.

more than others, and how much time they will take. You may know beforehand, for instance, that the last week of the month is always busy. Work extra hard to get ahead of schedule so nothing interferes with your tasks during the last critical week.

If you constantly juggle the conflicting demands of other people, you should become assertive. A polite "no" will get you off the hook when you must devote your time to higher priority work. The result: you become more productive.

Stress-management courses also offer tips to control anger. "I tell people to moderate their stress," says Ruppert. "For instance, why loathe somebody when a little dislike will do the trick?"

It can't hurt to see a doctor. You may already have physical problems that require treatment. Furthermore, stress management courses are no substitute for psychotherapy.

"Stress management is for people who are open to the idea that they can do something about stress, and open to lifestyle changes," says Ruppert. "Some people can't control their feelings in such a manner. They need more intensive help."

A videotape stress management course run by Grumman Data Systems includes a segment on "straight thinking." The literature provided for attendees outlines ways to combat illogical perceptions or beliefs — when you put too much stock in statements such as "I must be perfect," "Nothing ever goes my way," and "I'll never change."

Get in the habit of answering yourself logically.

Nobody's perfect. No one has *everything* go his or her way.

Most important, people can and do change for the better.■

So, How Do *You* Keep Your Cool?

"Many times, when I arrive in the morning, I think, where do I start?" says Sally Couluris, manager of document control and liaison for Grumman's Corporate Contracts department. "There is so much to do."

Couluris' area handles the detailed contractual documents for Grumman's government and commercial programs. Desks are piled high with forms and printouts, the by-product of ever-increasing government regulations.

"I try to tackle one thing and finish it," says Couluris. "I gain a sense of accomplishment and my stress level starts to subside. This is a better approach than working on 10 half-baked items at once.

"You need a good sense of priorities," she adds. "With help, most people develop that knack."

In Montgomery, Pennsylvania, Tim Gage runs an employee assistance program (EAP) as part of his duties as director of human resources. Grummanites in need can obtain low-cost help from local agencies and hospitals.

"Stress was really more of a problem last year, when we were still trying to get up to our rate of 95 Long Life Vehicles a day," he says. "People put in long hours and there were times when our ultimate goal seemed impossible to achieve.

"We're at what I call the stabilization period — the 40-hour work week when people are at their best," he says. "Stress may eventually increase for quite a different reason: boredom. In anticipation of that, we'll have to have step up our job enrichment and cross-training efforts.

"I also try to get people to walk two to three miles a day," he says. "Weather permitting, a group of us goes out at lunchtime for a walk down to the Susquehanna River.

Todd Hampson is foreman of the Chemical Milling, Chromic Anodize and Sulfuric Anodize departments in Bethpage's Building 3. In Chem Milling, patterns are etched in aircraft detail parts, while anodizing is a process that enables paint to adhere.

"In Chromic Anodizing, we expect to begin turning out 4,000 to 7,000 additional pieces each month sometime later this year, and there are always people looking for something to be ready," says Hampson. "Besides, there are more reports, tracking systems, and paperwork than ever before, which produce stress."

Hampson presses hard-working people to take vacations. "Every year, I have to remind one guy to take his two remaining vacation days," he says. "He's an excellent worker who catches up on his paperwork during lunch. I don't want him to get burned out."

There are other stresses in the shop. Since Building 3 is being modernized, trucks, bulldozers, and cranes are always on the scene. One recent day, a moving truck showed up without advance warning.

"I calmly told them I couldn't stop my operation — and they moved the truck so it wouldn't block the flow of our work to the next department," he says. "In my view, screaming and hollering never solve anything."

Help Is Available

- Grumman Data Systems' Personnel and Administration Department is running a multi-part videotape stress management workshop. The tapes are shown in Grumman Headquarters in Bethpage and in Woodbury. The series is open to all Grummanites in those locations.

The next segment will be "straight thinking." For more information, contact Karen Kienast, (516) 575-3257 or 346-6422.

- Empire Blue Cross/Blue Shield Healthnet offers a stress management seminar, which is conducted at YMCAs throughout New York State. It is open to members of this health maintenance organization (HMO).

Information was contained in last month's Healthnet newsletter. For further details, contact your Healthnet physician or call (800) 342-9741.

- Both on and off Long Island, other local hospitals and health maintenance organizations often provide workshops either free or for a nominal charge. One such program is offered by the Geisinger Hospital/HMO in Williamsport, Pennsylvania, near Grumman's Montgomery facility.
- Community-supported mental health centers also often sponsor stress management clinics.
- Your local YM-YWCA or YM-YWHA may offer a stress management course.
- Other possibilities include the adult education programs offered by your local school district or community college, or through chapters of the American Heart Association.

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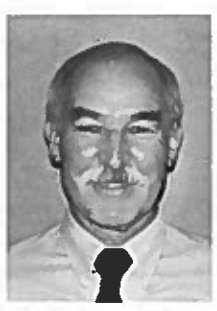
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F. A. Wohllebe

J. B. Zamojcin

G. R. Zang

Is Enough Being Done To Curtail Drug Problem?

Is the United States doing enough to curtail its drug problem? *Grumman World* asked Grummanites from the Aircraft Systems Division in Building 121 in Melville for their opinion. What do you think? (Photos by Rich Breunig)

Susan Kelly

We need more awareness of the drug problem in the schools. The kids using drugs are getting younger and younger. There needs to be counselling for children who appear to have problems and might be potential users. Maybe with more television ads we can show the kids what it's really like to be a drug addict. I have a 13-year old brother. He knows drugs are bad but I don't think he's aware of their side effects or the long term damage they cause. He thinks people get high and then just get over it.

Kevin Kavanaugh

I think a lot of the drug-supplying countries have their own governments behind them. Big money is really at the root of this entire problem. We have to get tough with the dealers. They are the ones we can get our hands on. We also need to help the people with drug problems so they don't buy from the dealers. Drug testing is a good deterrent and big companies should offer help and counselling for employees.

Truman Onderdonk

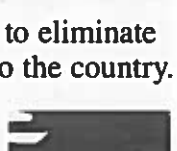
The only way to stop drug use is to stop it from coming into the country. However, how can they ever check all the containers in all the container ships that enter the United States? It would be impossible. You can take care of the marijuana problem with aircraft surveillance, but most of the other substances come in from the Far East on ships. I don't think this country can afford the kind of massive Customs checking that needs to be done.

Donald Hiestand

We have to make it too expensive for dealers to distribute the drugs. The laws should confine convicted dealers to life in prison without parole, for example. When the price of doing business is too high, it will close down. If the dealers knew for sure that when they got caught they would go to jail and never see daylight again, I think they might think twice, especially after a few had been sent away. Once it becomes too costly for the dealers, the suppliers will have to go somewhere else.

Steve Trenze

Our country's borders need to be monitored more closely. The Coast Guard has been doing a great job using Grumman E-2C's for surveillance of drug traffic. However, the Coast Guard's budget has been cut, and it may not be able to purchase any more E-2C's. I don't understand cutting the funds for something that is working to eliminate such a life-threatening problem in this country.



Kaj Browne

This country has got to crack down on its revolving door law enforcement. The penalty for drug pushers and users needs to be a lot stronger. The law enforcement agencies do their job. They arrest the criminals, but then the courts allow the criminals out on the streets again. I don't think we have the resources to stop the drugs from coming into the country, so we've got to correct the problem here at home.

Hank Williams

The ideal solution is to eliminate the drugs coming into the country. We can do that by eliminating the demand. The supplying countries will have to look for another market to sell their drugs. As long as we have drugs infiltrating this country destroying the minds of the young — our country's future leaders — any foreign government may some day be capable of having complete control of the United States.

Paul Regensburg

Stronger military actions should be taken. For example, satellites could be used to identify where the coca fields are. Then they should be destroyed. I think it's pointless to try and keep up with the dealers. It seems as though when one group of dealers gets caught, another one moves in. Unfortunately, the demand remains in this country. The yuppies and the middle-class users must realize they are using blood drugs. People are dying and casual users aren't any less responsible for all the destruction drugs are causing.

Tom Tyrell

I think we should use the military stationed within the United States to guard our borders against narcotic traffic. For example, we can temporarily move the Army bases from upstate New York to our borders for protection. Why just use the Coast Guard? The Navy, the Air Force and the Marines can help tremendously. We are using them abroad, why not use them here? They can conduct their training maneuvers and protect the country at the same time.

Personals

My family and I sincerely thank all our friends, co-workers and ESO for their kind expressions of sympathy and support after the recent loss of my mother. **Leon Magill**

To all of Harry Fuhrmann's friends: His wife Jean and sons William and Lawrence and their families would like to thank everyone for their kind expressions of sympathy. It helps at a time like this to know others care and will miss him too. We thank his good friends in Great River, Bethpage, Benton Park and Salisbury. Our family will remember you always as caring loving friends. **Jean Fuhrmann**

I wish to express a deep feeling of gratitude to ESO, Tech. Reps Bowling League, Bldg. 1 R&M section, Grumman Oceana and all of my friends at Grumman for their kind expressions of sympathy and support during the recent loss of my mother. It is greatly appreciated. **Bob Overdorff**

The support and sympathy expressed by my friends, co-workers and ESO has helped to comfort us during the sudden loss of our 20-year-old daughter while she was attending college in London. **The Pleckaitis Family**

Our family deeply appreciated the tremendous comfort and sympathy expressed by the Grumman family during the loss of our daughter, Jodie Beth. Your concern and sorrow helped tremendously during our time of grief. **Stan and Marcele Wong**

My family and I would like to thank our friends, co-workers and ESO for their kindness, sympathy and support during the recent loss of my mother. **Stephen Petrovits**

My family and I wish to thank all my friends and ESO for their many kind expressions of sympathy over the recent loss of my husband Teofil (Duffy). **Helen Rzeszut**

Milestones

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Joseph McCarthy, Bethpage, Aircraft Systems
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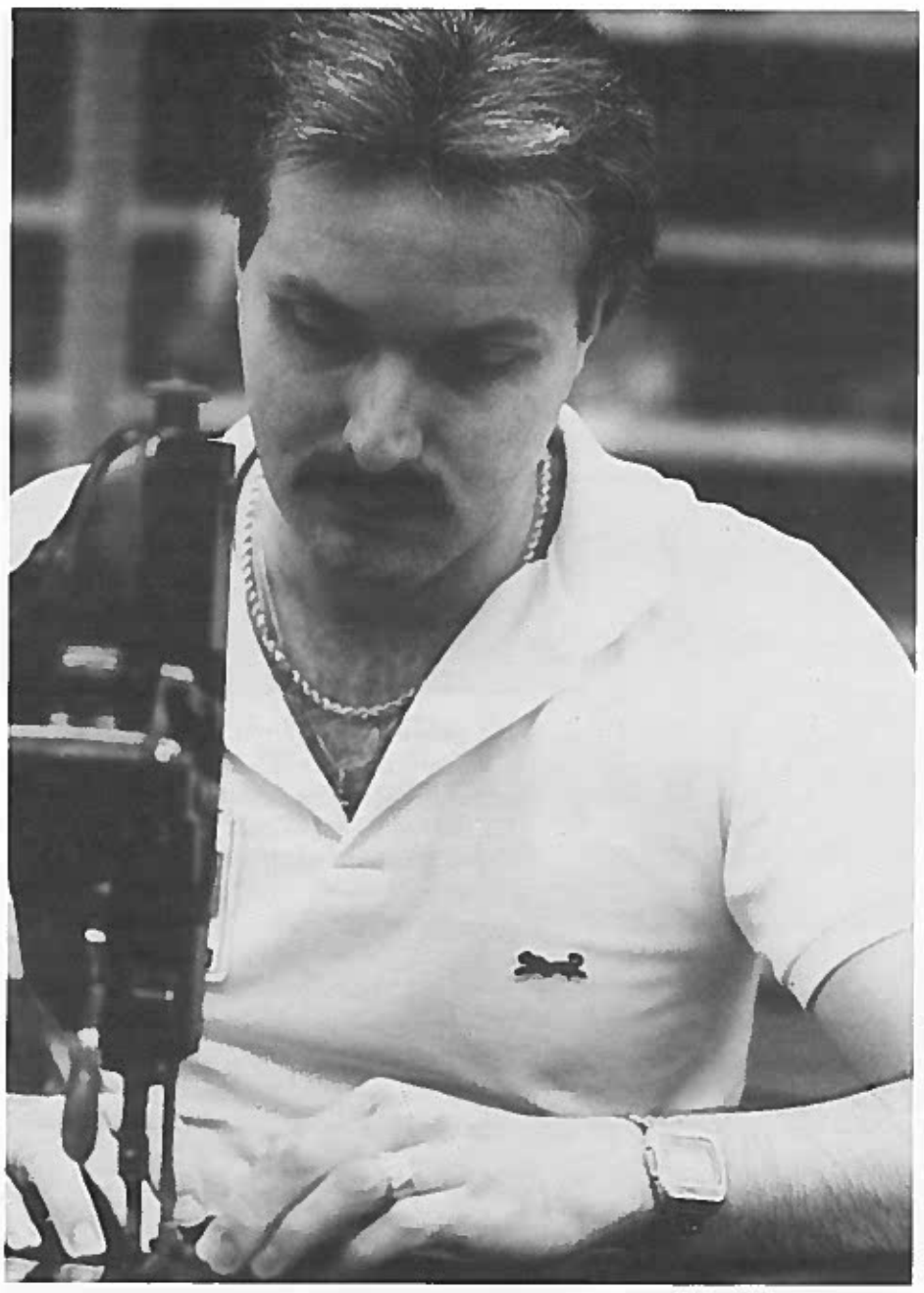
Alumni Support

March 31 is the deadline to file your receipts from your 1987 contributions to colleges and universities in the Grumman Matching Gifts program. Send them to Carol Nelson, A12-GHQ.

Project Sterling Suggester of the Year to be named at Grumman Motivational Program's annual awards dinner on Wednesday, April 6 at the Milleridge Cottage in Jericho, N.Y.



From Cover To Cover: They've Got It All Sewn Up

"I went from chiffon to Naugahyde," says Lillian Marchese. "When I watch a Grumman plane go down the runway, it's like watching one of my brides walk down the aisle."

Marchese is one of 19 people who work in Grumman's Upholstery Shop in Building 1 in Bethpage. Fourteen years ago she switched from designing and sewing wedding gowns to making parachute containers and other aircraft related items.

The shop could be a Calvin Klein manufacturing plant. Boxes of material line the walls. Material needed right away hangs from large spools over the cutter's table.

Above the hum of the 25-year-old Singer sewing machines, Anthony Viorritto, a 31-year veteran of the Upholstery Shop says, "We dress the aircraft to make it look nice."

The Upholstery Shop makes and installs the wall coverings, called blankets, for the E-2C and C-2A aircraft. "Blankets are installed for aesthetic reasons mostly," says leadman Bill Willis. "But the material is perforated, so it also absorbs the aircraft's loud noises."

Covers for the aircraft engines, seats, and props, parachute containers for the F-14 and a new backpack parachute container for the E-2C are just a few other items made here.

"The people who work in the Upholstery Shop make practically the entire interior for the aircraft," says foreman Bob Lentino. "Not to mention the harnesses for the guy who has to jump out of the plane. Every stitch has to be to spec."

"Just think of a spec as a sewing pattern," says Kenny Dorfmeister, known as "Kenny the Cutter." Using his Eastman Bluestreak fabric cutter—a standard in the industry—he cuts anything from nylons to soft cottons.

In addition, the shop does its own screen printing. It is also the cutter's job to label the material where printing is required. "There are strips of material, for example, that are hooked to a plane's landing gear that say 'REMOVE BEFORE FLIGHT,' " says Dorfmeister. "We print that here."

After cutting, the material and the pattern are given to the sewers. "It's a lot like my old job," says Blanca Cartagena. "I use to make ski jackets and a lot of the parts are just as bulky."

Parts wind up at the bench for fasteners, snaps or any hand finishing needed. After the part is inspected and approved, the Upholstery Shop installers fit it into the aircraft.

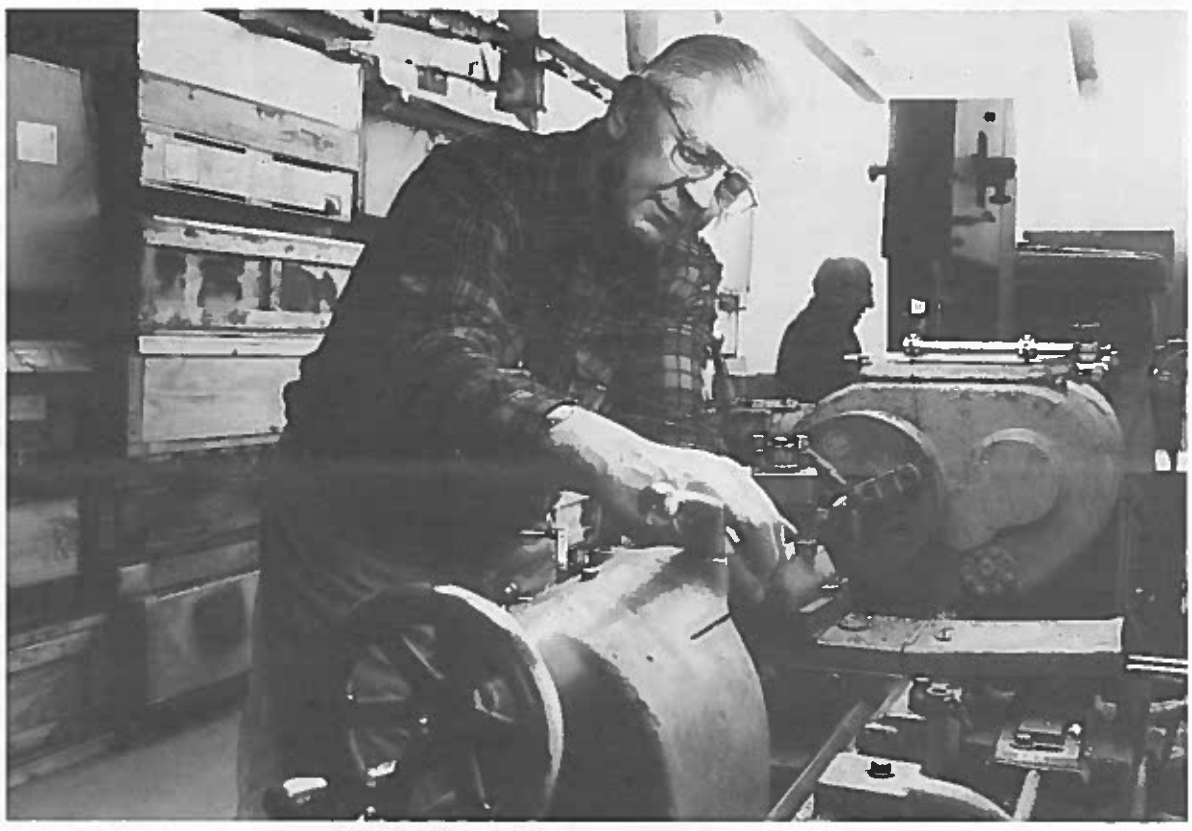
"One of the guys recently left for Melbourne with the carpet for the Joint STARS aircraft," says Lentino.

Harold Morgan stitches together a main gear wheel well cover for an Egyptian E-2C. "I've upholstered the interiors of cars and boats too," he says. "But that work never seemed as important to me as my job does now. I think I contribute as much to the performance of Grumman's aircraft as the guy who installs the engines."■

The Final Touch. *Joseph Cavallo does some trimming on an F-14 parachute container.*

They Keep Grumman In Stitches. *At the Upholstery Shop in Building 1, Bethpage, Jim Popolo (top) worked at the bench on finishing details before becoming a full-time upholsterer. Larry Kahane (R), fits a wall cover, called a blanket, into the C-2A aircraft, while Harold Morgan (above), continues working on one of the aircraft's covers. (Photos by Rich Breunig)*

Building Planes On A Small Scale. *(From Top L, Clockwise): Edwin Polese attaches bombs to the A-6E. Ben Mroz puts a finishing touch on the EA-6B. Rudolph Smatlak shapes model stands on the lathe while Fred Cilento sands down rough edges on the A-6E model before it is painted. (Photos by Bob Settles)*



These Retirees Are Model Grummanites

"Before I started hanging out with these fellows, I was a CPA," says Grumman retiree Larry Lueckoff. "A Couch Potato Advocate, that is."

Lueckoff is one of 10 retirees who get together every Tuesday in the back of Warehouse 6 in Bethpage to build scale models of Grumman aircraft and truck bodies.

Some of the models are sold through Employee Services, but most of them are used as promotional items by the Marketing and Public Affairs Departments.

The club's official name is The Model Technology Group. Charlie Chlanda, 80, is the group's leader. He started the club in 1978 when he was president of the Grumman Retiree Club.

"We used to build 900 models a year," says Chlanda, as he points to the group's production schedule on the wall. "These days we do about 400 a year. At one time we were building models of all the aircraft. Now we build the EA-6B, the A-6E, the postal vehicle and the Kurbmaster. We still keep plenty busy."

The models come in parts. The retirees put them together and add all the details. "These planes are exactly one twenty-fourth the size of the real McCoys," says Chlanda. "The details have to be exact."

"It was a lot more fun when the models were brighter colors," says Charles Salerno, who builds the model stands and puts on the plane's finishing decals. The new models conform to the Navy's camouflage paint scheme: shades of gray, and barely visible silver decals where the red ones used to be.

A 30-year Grumman veteran, Chlanda runs the club's activities much the same as he did when he was a supervisor in the Quality Assurance Department. "You've got to look for hidden talents in people," says Chlanda. "And then capitalize on them."

"I never worked in a shop," says Bob Morace. "I started here as a packager. But in the last 10 years, the guys have taught me a lot. Now my specialty is line drawing."

It's a tight group. They all retired around 1977 and most of them have known each other for 25 to 30 years. "But don't think just because we're all friends that we spend our time shooting the breeze," says club member Ed Polese.

Polese proudly displays his Retiree Model Technology badge. As he carefully assembles the A-6's bomb racks, he says, "Coming to work here is like a continuation of my 30 years as a Grummanite. It was a pleasure to go to work then, and it's a pleasure to come here now. There are no whistles, no time cards to fill out, but we are here early and stay until we finish the job."

Second to his three-year-old grandson, Fred Cilento enjoys his Tuesdays the most. After suffering a stroke three years ago, he has had to lighten up his duties a little. But he says it's the club that keeps him going. "I love coming in and hearing all the latest Grumman news. This place makes me feel alive and in touch. Doesn't it, Frank?" he says.

Frank Salvato says, "Hey, once a Grum always a Grum. When you retire, you need to keep doing something useful. It makes me feel good to know that my hard work may decorate someone's office for years and years after I'm gone."■

Peterson Taking Shot At Olympic Gold

How many folks do you know that wouldn't mind 22,000 people chasing after them?

Grummanite Pat Peterson is getting used to it. He came in fourth in the 1987 New York City Marathon and 12th in the 1988 London Marathon.

Peterson is now in training for the United States' Olympic trials. The trials will take place April 24 at the Waterfront Marathon in Jersey City, New Jersey. The top three runners will represent the U.S. at the Summer Olympics in Seoul, South Korea.

Peterson ran last year's New York City Marathon in two hours and 12 minutes. In 1987, he was ranked number one in the U.S.A. for long distance running by *Track & Field News* magazine. Rank is based on race conditions, course difficulty, speed, and weather conditions.

"There may be four or five people faster than me," says Peterson. "But they may have run very flat, easy courses. There's a big difference between that and running up and down hills."

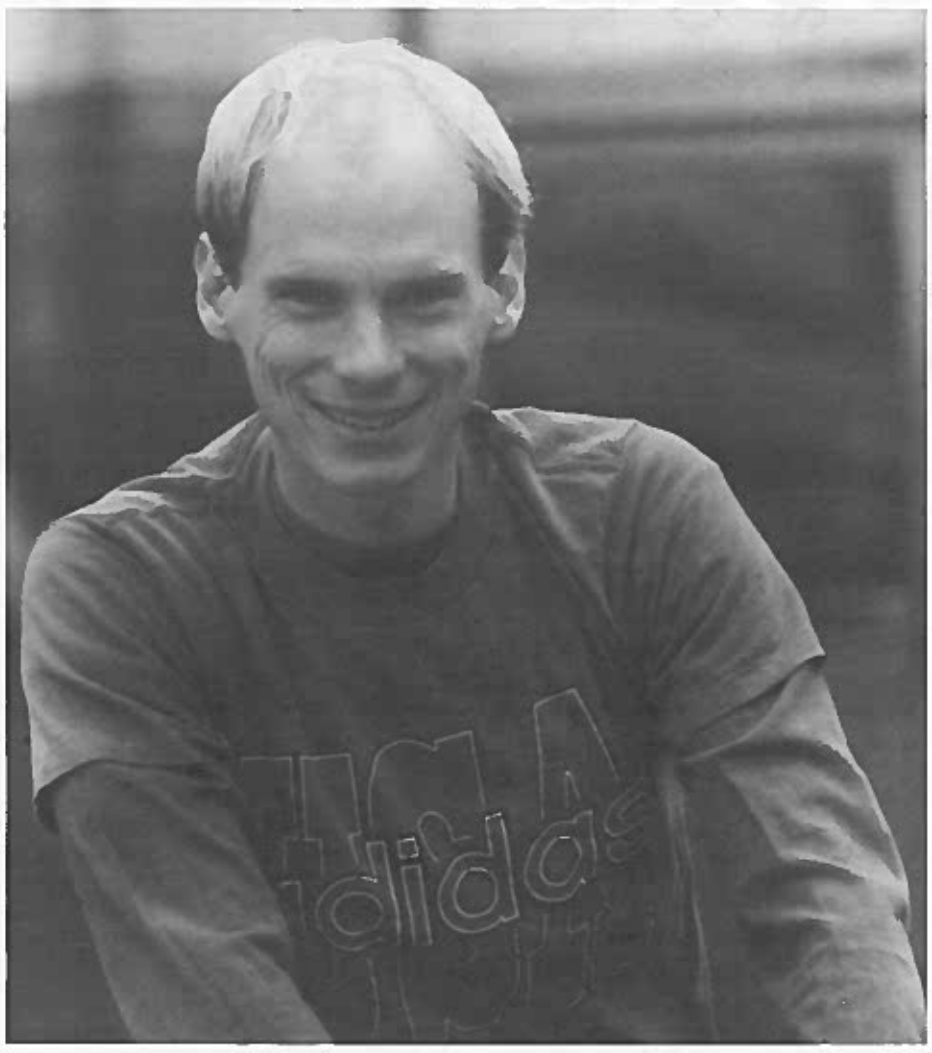
Peterson works in Data Systems' Information Resource Management Department. The company has allowed Peterson to work part-time while he is training.

"Grumman people have been very cooperative," says Peterson. "They realize this is a once-in-a-lifetime chance."

Peterson has been running competitively for 14 years. He is now running 85 to 110 miles a week to prepare for the Olympic trials. "Ideally, if you've trained properly, you don't even feel the first half of the race," says Peterson. "You may be very fatigued at the end, but that's what you train for."

To win a spot on the Olympic team, Peterson says he'll have to run the 26.2-mile course in about two hours and 11 minutes. That means cutting his fastest time by only a minute.

"I think I have a real good shot at making the team," says Peterson. "I've been training hard, and that's what makes a winner."■



Running For The U.S.A. *Data Systems' Pat Peterson will compete for a spot on the United States Olympic track team on April 24 in the Waterfront Marathon in New Jersey. The top three finishers will run for the U.S. at this year's Summer Olympic games in Korea. (Photo by Rich Breunig)*

Next Lecture Scheduled For May 26

Melvin Hartmann of NASA's Lewis Research Center in Cleveland, Ohio, will be the guest speaker at the next Leroy Grumman lecture.

The lecture will be held Thursday, May 26, at 4:30 p.m. in the Grumman Headquarters auditorium, Bethpage.

Hartmann is director of Research and Technology Assessment at the Lewis Research Center. His topic will be advanced propulsion systems.

The lecture series was established in honor of Leroy Grumman, one of the company's founders and its first chairman and president. The series aims to continue his commitment to technical excellence.

All Grummanites are invited, but space is limited. To reserve a seat, call Mary Mickol at (516) 575-8770.

Community Achievement. *Nassau County Executive Thomas Gulotta recently presented a citation to Grummanite Mary Chisholm (C) for 'her outstanding achievements in the community.' Chisholm was honored for her volunteer work in the Nassau County Office of Women's Services. She is assistant to Aircraft Systems Senior Vice President-Program Management Pete Oram. Also present at the ceremony was Geraldine Linton (R), director of the Office of Women's Services.*

Readership Survey

We don't want to do all the talking. We'd like to know what you think about the things you see in these pages. Your comments, suggestions and complaints are welcomed. Please take a few minutes and give us your opinions.

Article	Great	Good	Poor	Didn't Read
ATS (P. 1)	☐	☐	☐	☐
Stuart Operations (P. 3)	☐	☐	☐	☐
F-14D Avionics Lab (P. 4)	☐	☐	☐	☐
Tokamak (P. 5)	☐	☐	☐	☐
Scanner (P. 7)	☐	☐	☐	☐
Stress (P. 8)	☐	☐	☐	☐
What Do You Think? (P. 12)	☐	☐	☐	☐
Upholstery Shop (P. 13)	☐	☐	☐	☐
Retiree Model Builders (P. 14)	☐	☐	☐	☐
Olympic Runner (P. 15)	☐	☐	☐	☐
Chairman's Letter (Back Cover)	☐	☐	☐	☐

Suggestions For Future Articles:.....

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Mail to: Grumman World, A22-GHQ
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GrummanWorld
March 25, 1988

(Photo by Bob Semles)

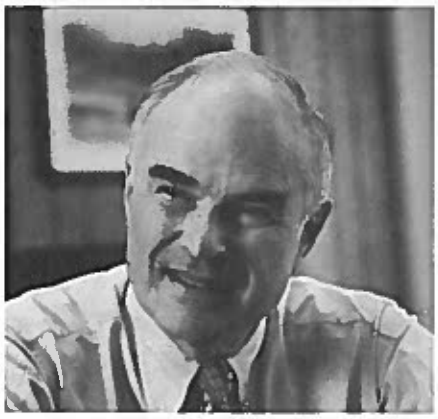
Master Model Builder

Edwin Polese and nine fellow Grumman retirees have built over 6,000 models of Grumman products in the last decade.

The Model Technology Group, started in 1978, supplies the Marketing and Public Affairs departments with scale models of the A-6E, EA-6B, LLV and Kurbmaster for use as promotional items.

Polese worked at Grumman for 30 years and retired in 1978. His specialty is attaching the bombs to the A-6E model aircraft. (See story on page 14)

A Letter From The Chairman



The aircraft business is the cornerstone of Grumman. All of our other businesses have grown from it and have been nourished by it.

The primary assignment of the Aircraft Systems Division is to design and build military aircraft — such as the F-14, A-6, E-2 and the EA-6. As these programs mature, Grumman upgrades and rebuilds them into more advanced versions. Our EA-6B, for example, is 17 years old and in its fifth incarnation. It is now many times more capable than it was in 1971, and it is still the only tactical jamming aircraft of the U.S. Navy.

Other programs, such as the C-2, EF-111 and Peace Pearl, are part of the Aircraft Systems Division for set periods of time. They are important manifestations of our technologies, and they may come back again and again in various ways. Certainly we hope to see the EF-111 back again as a major Grumman program, and the Peace Pearl looks to be a key item in our U.S. Air Force and Far Eastern relationships.

Recently, there have been articles in newspapers and magazines about Grumman leaving the aircraft business. This, of course, is complete nonsense. Except for the A-6, whose life expectancy is being settled now in Washington, all of our aircraft programs are in good shape. In fact, our aircraft sales last year were higher than they were five years ago. Our airplane business isn't growing as quickly as some of our newer businesses are, but we had predicted that and planned for it. Growth in other areas is important to the health of Grumman as a whole — and this is essential to the continued health of all the parts, including Aircraft Systems.

That doesn't make the nonsense publicity any easier to take. The airplane business is our identity; it's part of our psychological makeup as a company. We all reveled in the flight sequences in "Top Gun." Grumman people from Sturgis, Michigan, to St. Augustine, Florida, sport "Anytime, Baby" bumper stickers on their cars.

But let's be intelligent, practical aircraft builders. We want to build the best. We want to help defend the free world with our advanced capabilities. We know we don't have enough money to fund the federal deficit, or any visible part of it. In 1969, our enthusiasm and a short-sighted DoD policy combined to give us a near fatal case of pneumonia on the F-14 contract. The F-14 program, considering the losses taken in the early '70s and in '87, is in fact still in a loss position.

The hidden price of the 1969 F-14 contract in lost opportunities was perhaps worse than the near bankruptcy we suffered in 1973. We became unacceptable as a competitor to build the shuttle for NASA. There were dozens of programs that we couldn't consider or for which we weren't considered. We were on the critical list for several years.

And in spite of our enthusiastic pursuit of the ATA, we must recognize that we may have avoided "winning" what would have been for us a similar contract. Maybe it will be just great for the winners — but it wouldn't have been for us, considering the reputed price. In the meantime, we will be ready and able to take on other opportunities as they come along during the next few years.

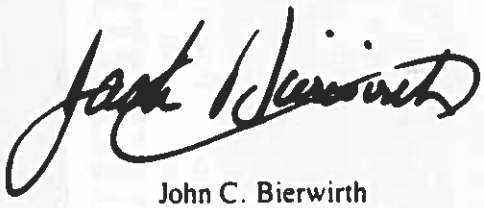
What we cannot do is decide to be willing to lose in a competition when the terms and conditions are unacceptable — and then feel defeated by the announcement.

As a company we are ready to invest substantially in our future, provided that we know and accept the limits. The X-29 was an outstanding success. We put $50 million of our own money into that program. The success of the X-29 was largely responsible for our winning the Peace Pearl, and there have been other resulting benefits. Increasingly, the realm of aircraft is international: 20 countries now have, or are considering, their own fighter aircraft programs. If we have vision and scope, we can help meet those requirements.

In the 1990s, there will probably be a program in our own country to develop a multi-purpose electronics aircraft. This would be a logical target for Grumman, and we have a head start on it. We are already doing initial studies with our own money and with government funding. Interestingly, many of our competitors for that work could be pretty busy on the ATA and the ATF.

This is a difficult time for our airplane business, but we can't squander our resources and talents on no-win, all-risk programs. If this is the correct analysis, the opportunities for companies willing to stand back and wait, as we are, could be most worthwhile.

Grumman has been the designer and builder of superior aircraft for more than 50 years. So it is today, and so it will be 50 years from now.



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